

THE RECIPROCATING STEAM-ENGINE

In the type first mentioned the crosshead body and the piston-rod are in one solid forging, or there is a palm on the rod, which forms a base for the part in which the bearings are seated. Both these designs necessitate that the rod be withdrawn downwards into the crank-case, but this may be an advantage, especially in small engines used on board ship where head room may be restricted.

The slippers are of cast iron and are secured to the crosshead forging by screws with countersunk cheese-heads. A tongue is formed on the outer surface of the crosshead, which fits in a recess or groove turned in the slipper. This serves to locate the slippers and takes the forces due to inertia and friction. The slippers are secured to the crosshead by two or four phosphor-bronze screws with countersunk cheese-heads. This design is illustrated by fig 40.

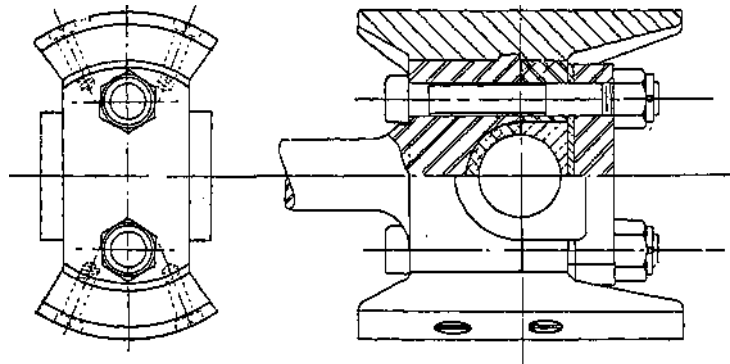


Fig. 40 r—Crosshead for High-speed Engine

Another variety to suit the same type of connecting-rod is shown by fig. 41. In this case the crosshead is secured to the piston-rod by a palm upon the latter. The crosshead body is of cast steel, the slipper being cast with it. The whole structure is held together by the two bolts. In this case a flat guide is used, fitted with guide strips in the usual way. Sometimes the face of the slipper is lined with white metal, but experience has proved that the low bearing pressure and copious forced lubrication render the white metal unnecessary. The maximum bearing pressure due to the piston load at the point when the angularity of the rod is greatest, multiplied by the ratio of the connecting-rod to the

crank, should not exceed 35 to 50 lb. per square inch over the whole surface of the slipper.

The crosshead bolts may be given a stress of 4000 to 5000 lb. per square inch at the bottom of the thread, and should be turned down in the body to that diameter to give more resilience, collars being left of the full diameter at each end and opposite the joint in the brasses. It is most important that a good fillet should be left under the head of the bolt.

The brasses should be made of phosphor bronze or hard gun-metal, and may have a thickness at the crown of $0.2d \pm J$ in., where d in. is the